EXHIBIT 17

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IPTV Delivery Architecture

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ITU-T IPTV Global Technical Workshop
Seoul, Korea, 12-13 October 2006

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IPTV Definition

- IPTV is defined as
  - Multimedia services:
    - Television / video / audio / text / graphics / data
  - Delivered over managed IP based networks providing appropriate
    - QoS / QoE, security, interactivity and reliability.
- Key features of IPTV
  - Supportable by NGN
  - Bi-directional networks
  - Real time and non-real time service delivery

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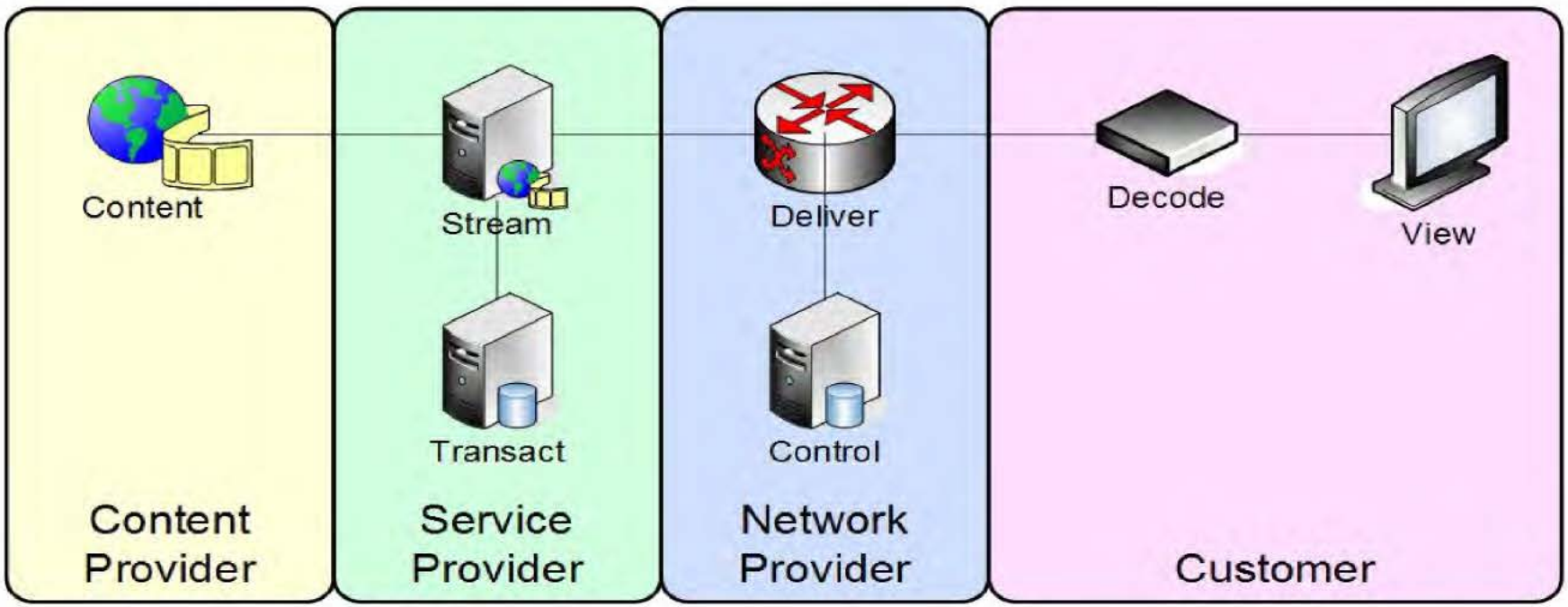
IPTV Concept & Roles



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IPTV Roles [Domains]

- Content Provider
  - Owner of content
  - Delivers contents as: Streams, Files, Tapes ...
- Service Provider
  - Provides IPTV Service
  - Ingests and protects IPTV content
- Network Provider
  - Delivers streams from Service Provider to Customer
- Customer
  - Selects and consumes content
  - Pay bills

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Derive Requirements from Service Outlines

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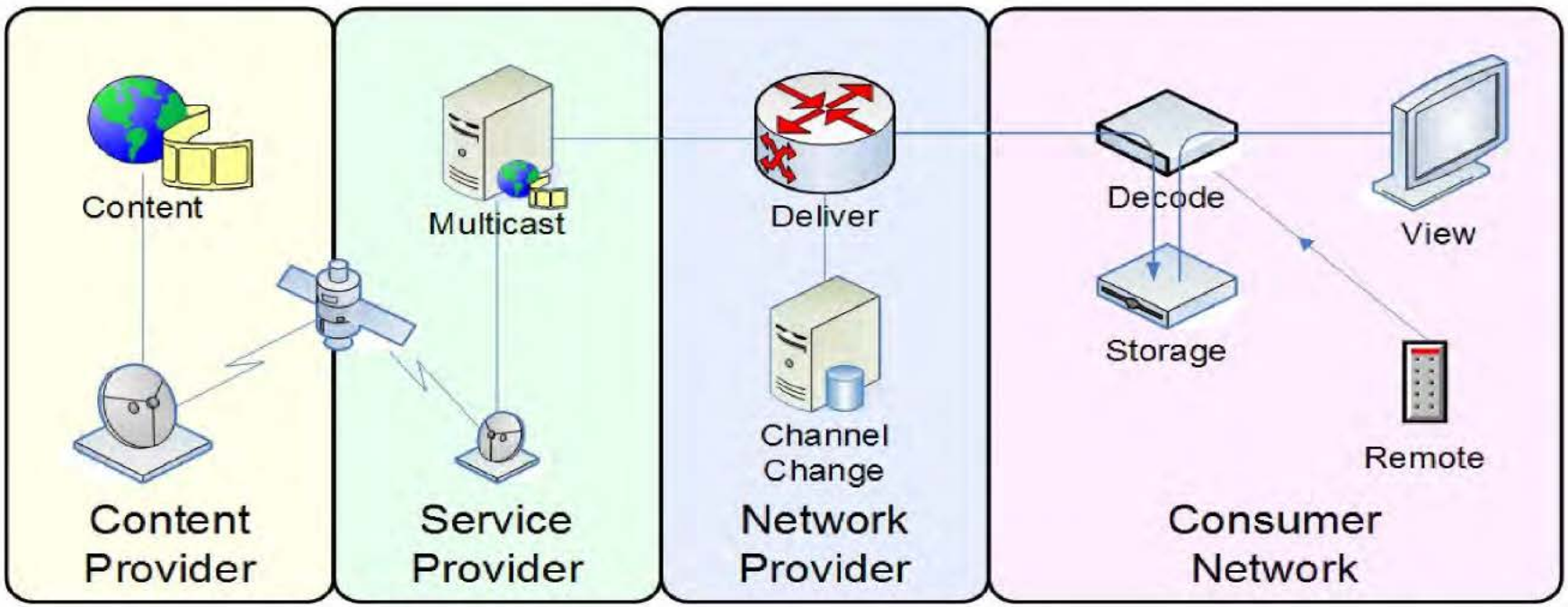
Linear TV with Local PVR



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Linear TV with Local PVR

- Multicast distribution
  - Very low error rate, low latency transmission
    - Potential need for network and application layer FEC
  - Multicast control in LAN and WAN
- QoS in Network
  - Ensure IPTV traffic not disrupted by other traffic
    - WAN Traffic prioritisation
    - Admission control, especially for Access Network
- Local Storage in IPTV Terminal
  - PVR, Trick play (Fwd, Rew, Slow ...)
- TV Service
  - User and subscription management

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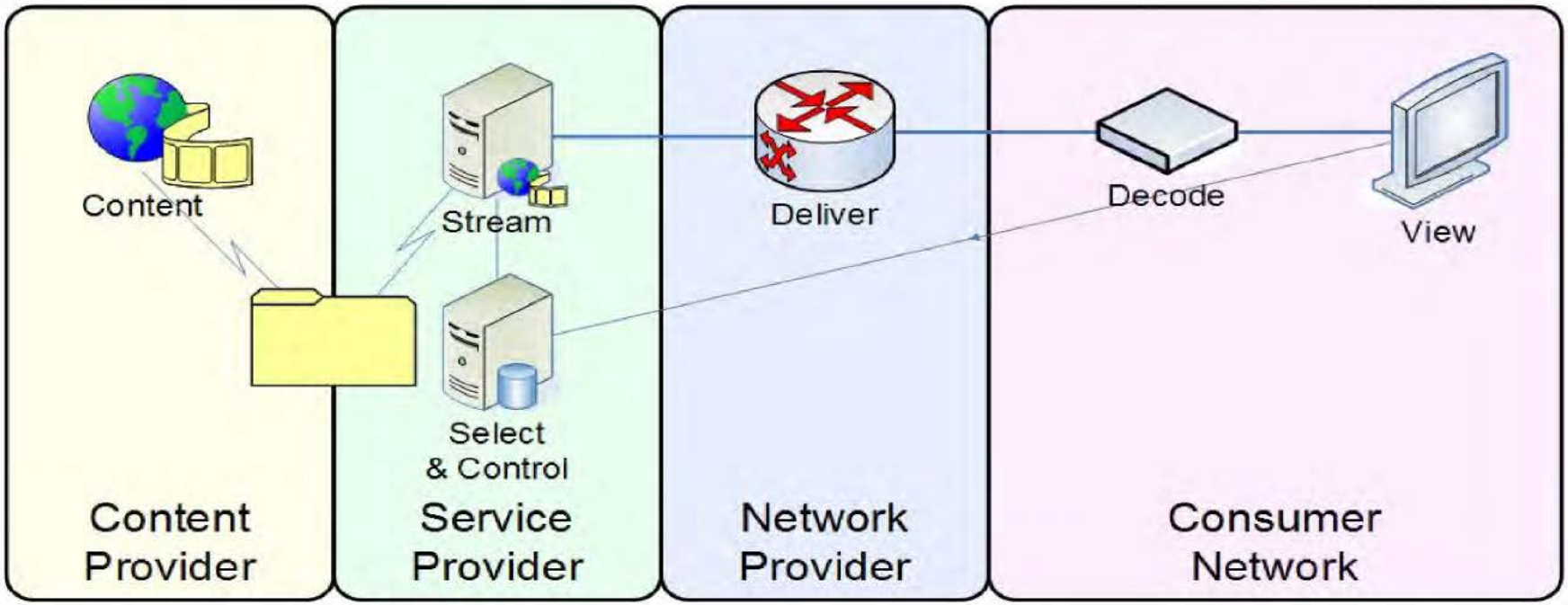
Content on Demand



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Content on Demand

- Unicast distribution
  - Very low error rate, low latency transmission
    - Error Correction by
      - Network and application layer FEC
      - Retransmission
- QoS in Network
  - Ensure IPTV traffic not disrupted by other traffic
    - WAN Traffic prioritisation
    - Admission control, especially for Access Network
- CoD Service
  - User and subscription management
  - CoD management and control server

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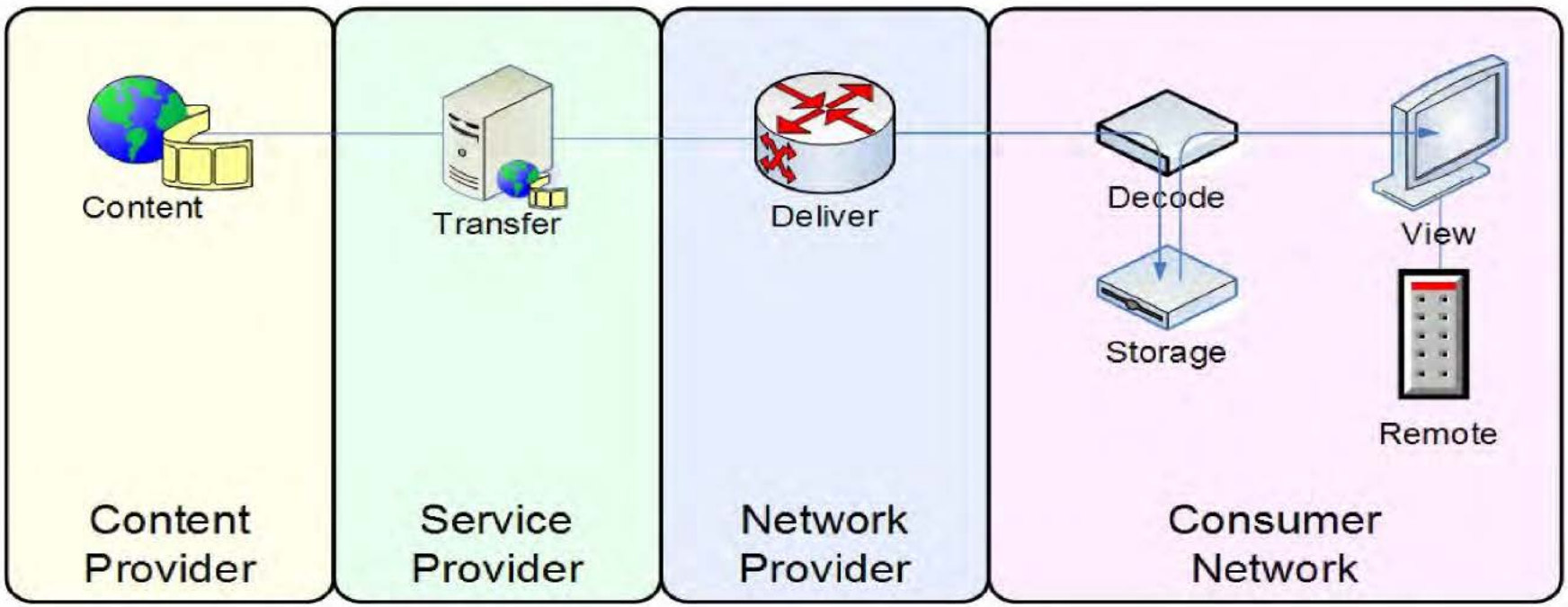
Pre-delivered Content on Demand



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Pre-delivered Content on Demand

- Delivery Options
  - Unicast
    - Error free reception by protocol
- Network Control
  - Limited or no Admission Control or QoS
- Local Storage
  - Delivery and Trick play (Fwd, Rew, Slow …)
- CoD Service
  - User and subscription management
  - CoD management and control server

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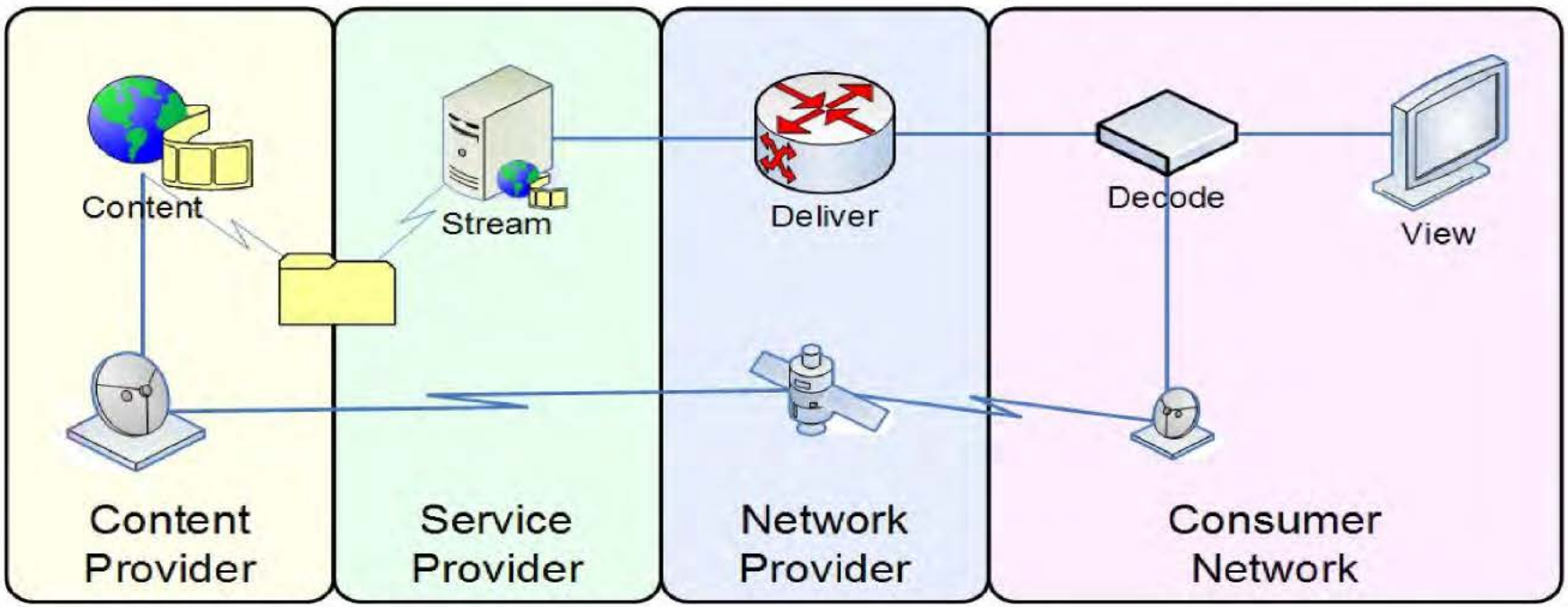
Hybrid: Online and Off-air Delivery



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Hybrid: Online and Off-air Delivery

- Online Requirements
  - As per Content On Demand
- Off-Air
  - Local Terrestrial or Satellite Receiver
  - Local Storage in IPTV Terminal
    - PVR, Trick play (Fwd, Rew, Slow …)
- Service Requirements
  - As per Linear TV and CoD

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Service Operational Requirements

- Customer Domain
  - Network connection with LAN QoS
  - IPTV Terminal
    - Set Top Box connected to a TV
    - Soft-client on PC or Games Console
- Service Provider Domain
  - Operational and Business support systems
    - CRM, Fulfilment, Assurance, Configuration, Billing, …
  - IPTV Application
    - Content identification, selection, purchase, …
- Content Provider Domain
  - Production, Contract Management, Encoding, …

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Common Network Requirements

- Network Transport
  - Multicast streams - one to many
  - Unicast streams - one to one
  - Point to point IP connectivity
- Network Authentication
  - Normally provided by Home gateway
- Network Upstream & Downstream Control
  - Admission Control
  - Traffic Prioritisation
- Network Session
  - Multicast - long duration, maintained across channel changes
  - Unicast - duration same as content

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Add Detail to Domain Model

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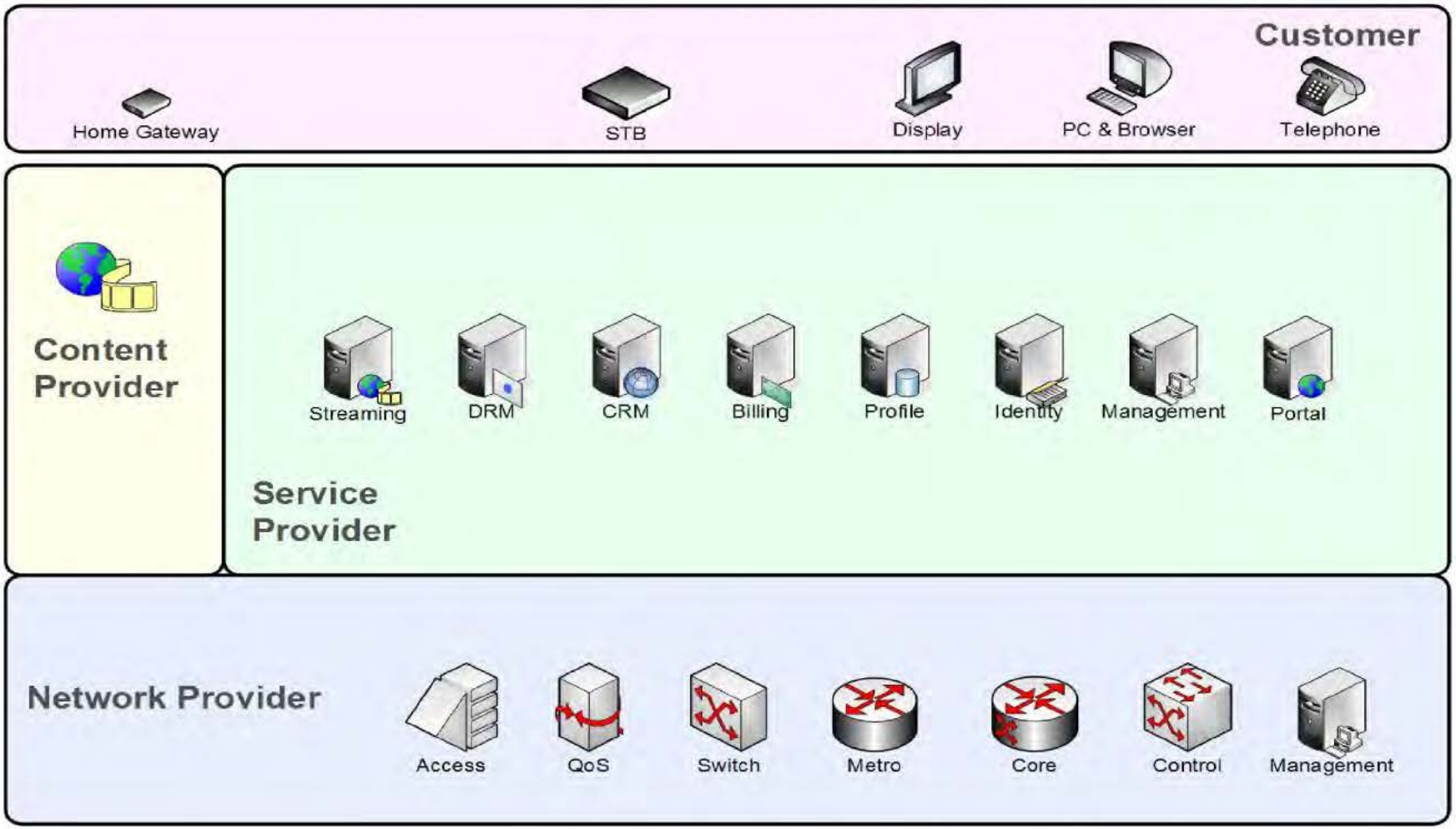
IPTV Functional Components



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IPTV Functional Components

- Customer
  - Home gateway, Set Top Box, Display, PC, Phones
- Content Provider
  - Content: Files & Off-air streams
- Service Provider
  - Streaming, Digital Rights Management (DRM), Service Portal
  - Customer Relationship Management (CRM), Billing
  - Customer Profiles, Customer Identity, Service Management
- Network Provider
  - Management, Control & Quality of service
  - Transport: Fixed (DSL, Fibre, Cable), Mobile

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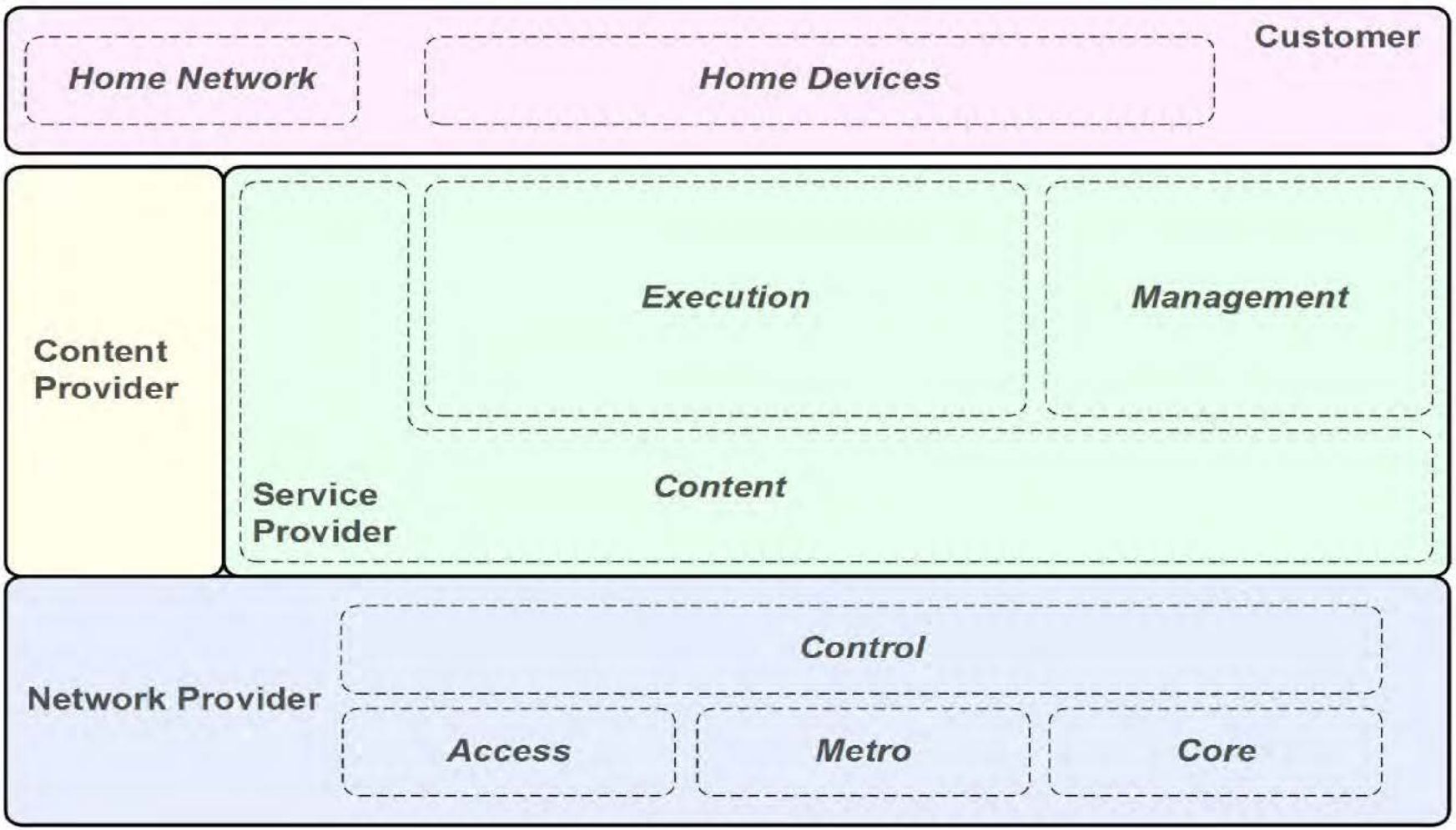
IPTV Domains and Sub-Domains



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IPTV Domains and Sub-Domains

- Customer
  - Home Network
  - Home Devices
- Service Provider
  - Service Management
  - Service Execution
  - Content Processing, Management & Streaming
- Network Provider
  - Control & Management
  - Transport: Core, Metro & Access
- Content Provider

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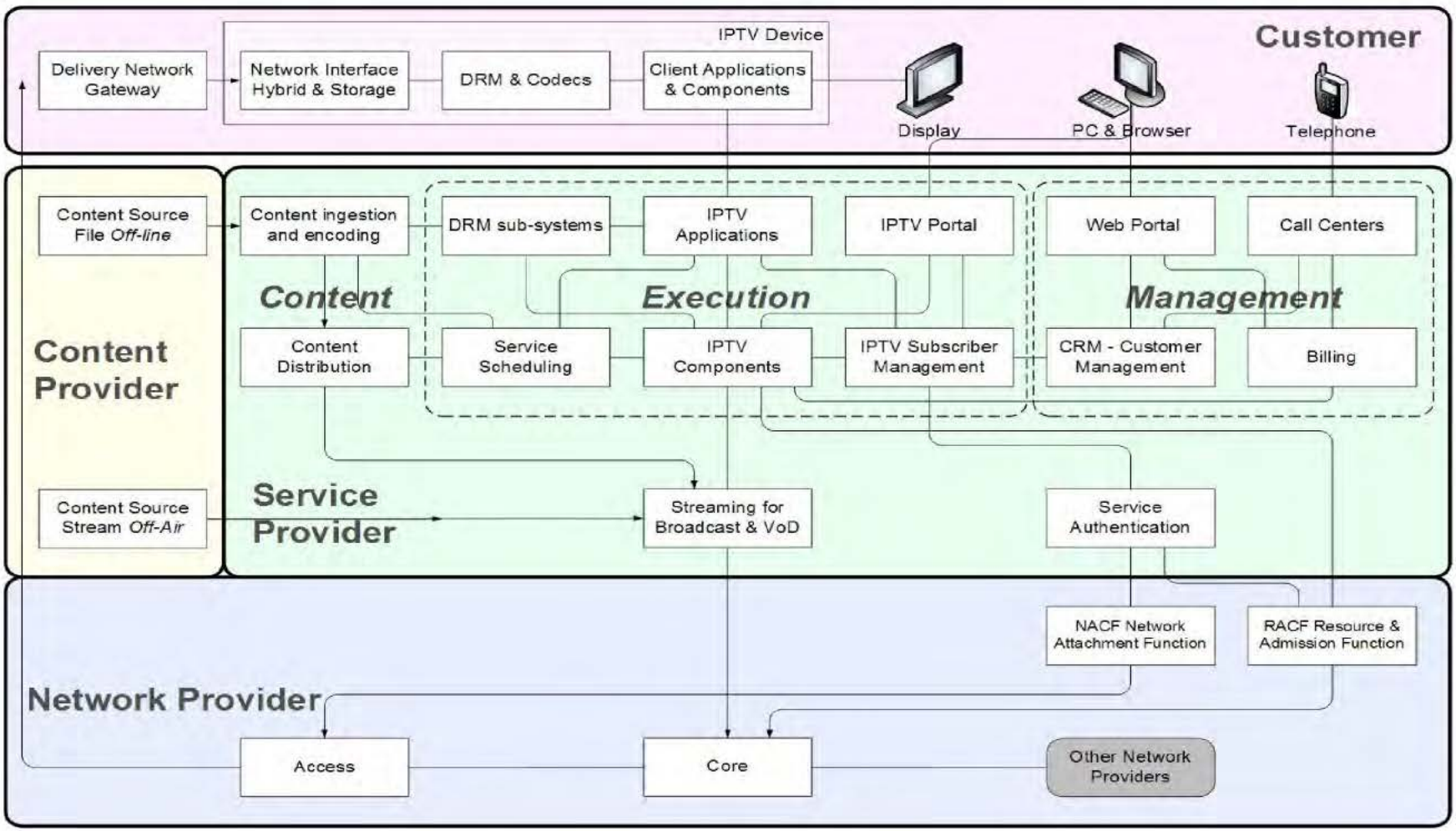
IPTV Functions



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Consider Delivery Over Real Network Architecture

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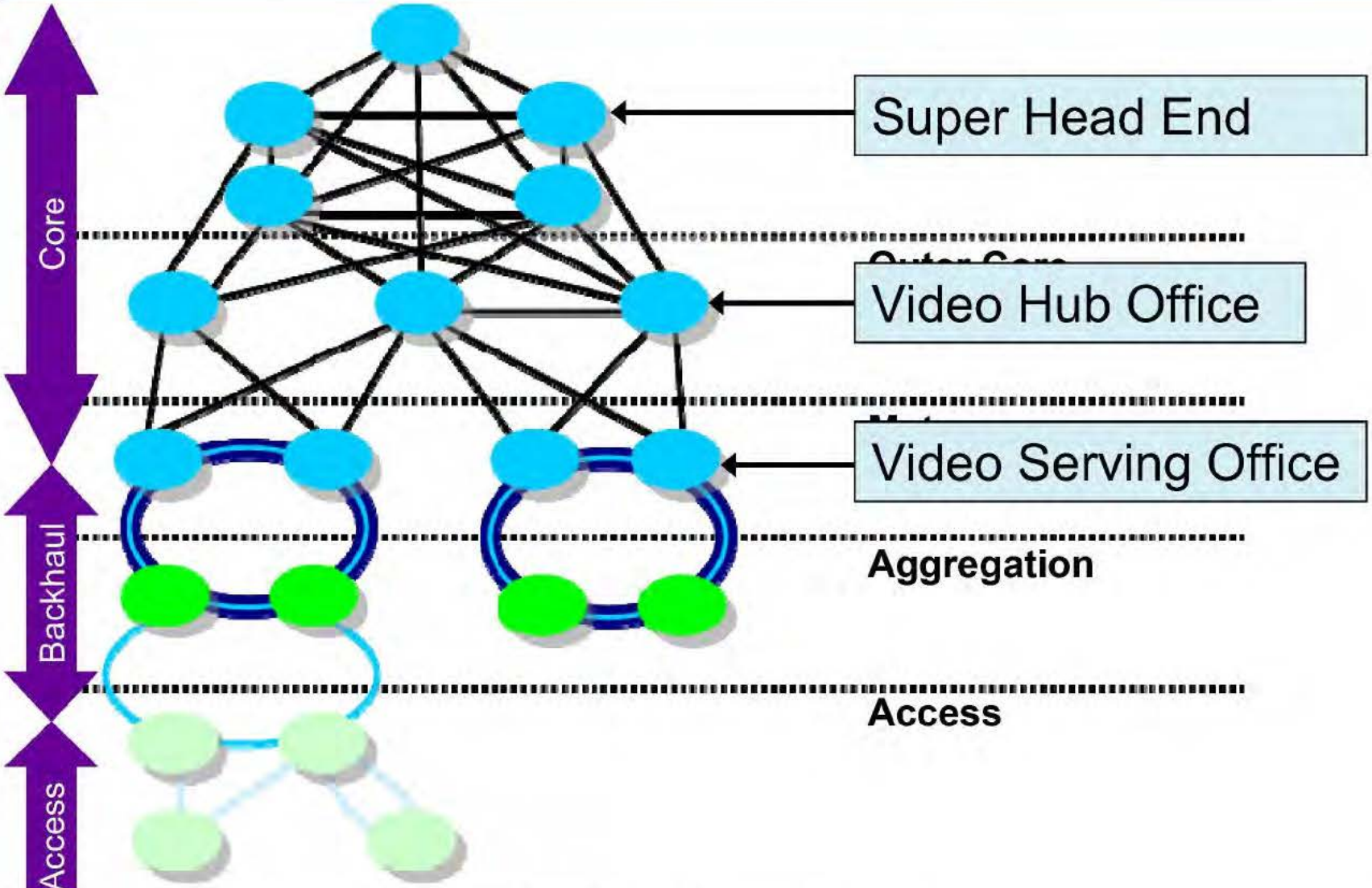
Typical Network Hierarchy



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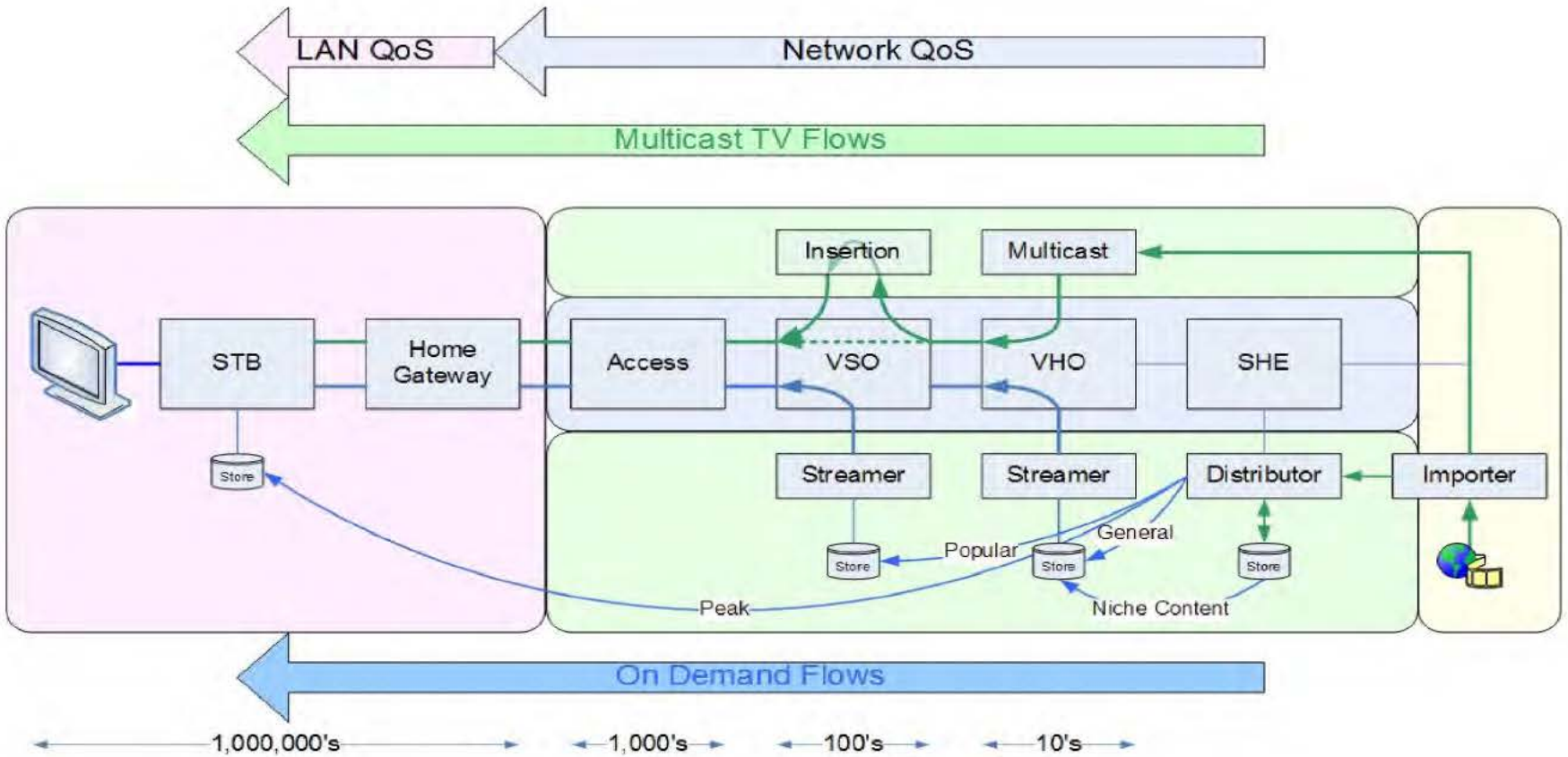
Approaching Network Hierarchy



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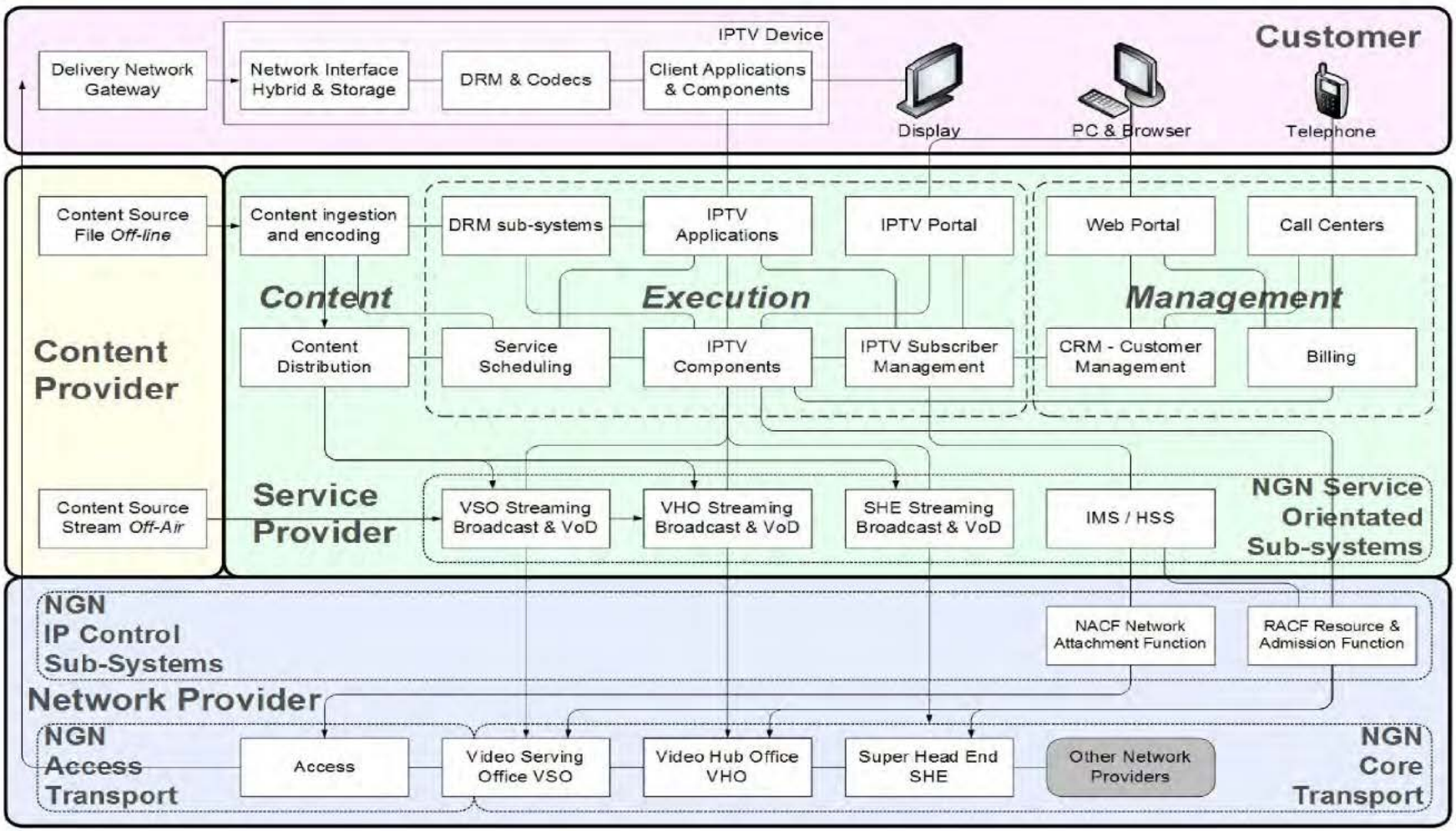
IPTV to NGN Mapping



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NGN Support of IPTV Requirements 1

- Network Transport
  - Multicast streams – Supported by NGN: IGMP & UDP
  - Unicast streams – Supported by NGN: TCP or UDP
- Network Authentication
  - Home gateway to NACF with DHCP / PPPoE
- Network Downstream Control
  - Admission Control – Supported by NGN: RACF
  - Traffic Prioritisation – Supported by NGN: MPLS

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NGN Support of IPTV Requirements 2

- Application Authentication
  - Registration of IPTV Terminal to IPTV Application
- Multicast Session
  - Long lifetime (hours, days, …)
    - Maintained when IPTV Terminal is active
    - Not impacted by channel change
  - Initiated by IPTV Application
  - Downstream control
    - Access network via RACF
    - Metro & Core by capacity planning

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NGN Support of IPTV Requirements 3

- Unicast Session
  - Shorter Lifetime (minutes, hours, …)
    - Maintained when Content is being streamed
  - Initiated by:
    - Fixed line IPTV: IPTV Application
    - Mobile IPTV: IMS
  - Downstream control
    - Access, Metro & Core via RACF

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End

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